An
Inaugural Dissertation

On
The Typhoid Fever of Amelia Cty. Va
in the years of 1827-8

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For
The degree of Doctor of medicine

In
The University of Pennsylvania

By
Peter H Anderson

of
Virginia

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To

Nathaniel Chapman, M.D.

Professor of the Institutes and Practice of Medicine and of Clinical Practice in the University of Pennsylvania

Dear Sir,

Deeply cherishing the sentiments of esteem awakened by your publick lectures; your friendly admonitions; exemplary conduct and persevering industry, I embrace, with eagerness, the opportunity offered, of rendering unto you, my warmest thanks. For your steady friendship towards me, since I have had the honour of being your private pupil; for the difficulties which you removed by your private instructions; for admiration of your talents, and esteem for your virtues; permit me to dedicate to you, the following sheets, as a small and grateful tribute, to your splendid

abilities, and private worth; and to hope, that you may long enjoy an illustrious and happy life, and long remain an incentive to industry to the physicians of America.

Your obedient Servant,

and obliged friend

P H Henderson

To

Joseph B Anderson, M D.

Dear Sir,

The connection existing between us, forbids the free expression of my feelings; yet, I should neither be just to myself, nor stand acquitted of my duty to you, were I to neglect the present opportunity of expressing the deep gratitude, which I feel towards you, for the many advantages enjoyed, through your hands, in the commencement of my studies; for your confidence in me, manifested in permitting me to assist you in your practice, especially during the prevalence of the late epidemic; also for many useful suggestions respecting its nature and treatment.

That you may be blessed with longevity, and prosperity, is the sincere wish of

Dear Sir

your unceasing friend,
and Brother
The Author

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Previous to entering into the history of this disease, it is necessary to make a few remarks respecting the local situation of this County, the seasons, and state of health of the Inhabitants for some months prior to its commencement.

Amelia County throughout, is hilly and intersected by numerous vallies and large swamps; through the centre of which pass small currents, which at certain places spread to so considerable a width, as to convert large portions of them into marshes. In their natural state, they contain little, or no stagnant water, but have

a free outlet: hence the removal of the water before it becomes stagnant. It is followed, however, immediately by a fresh supply; thus keeping them constantly inundated.

With respect to the seasons, and health of the Inhabitants. The fall of 1826 was as healthy as usual for the season. There were a few cases of Inflammatory Bilious Fever, which readily gave way on the approach of winter; and from that time, until the commencement of the fever under consideration, the inhabitants continued healthy. The winter had been very moderate; the spring was rather foward, remarkably calm, and seasonable throughout. Vegetation of every description advanced with unusual rapidity, until the 1st of June, when the weather became very dry and continued so,

until 15th of July; when a violent gust, accompanied with immense torrents of rain, occured. The quantity of rain, which fell, within the space of a few hours, is almost incredible. Streams of every description ever flowed to an unusual extent. The strongest milldams being insufficient to withstand their violence, were rend asunder, and the most of the County was deluged. Many of the dams were unrepaired; and the ponds, which were saturated with water, exposed to the rays of the sun, consequently, vegetable matter, which had been accumulating for several years was speedily decomposed.

After the cessation of the storm, the weather was extremely warm. The Thermometer ranged between 95 and 98 de-

grees of Fahrenheit. Not more than eight or ten days had elapsed, before the Typhoid Fever commenced.

By the 1 of August it had made rapid progress, and continued throughout the autumn with little or no abatement. On the approach of winter, though in some degree checked, yet, it was not arrested. In the beginning of the ensuing spring and summer, it broke out with great violence. At the close of summer, however, it gradually gave way, after having continued upwards of twelve months.

There was much diversity of opinion respecting its precise nature, as well as the best mode of treatment. By some it was pronounced to be genuine Typhus; by others to be of a nature intermediate between Ty-

nocha and Synochus; they consequently called it Typhoid. The latter opinion was adopted by our most inteligent practitioners. I have always believed with Dr Chapman, that genuine Typhus is the result of crowded & badly ventilated places.

The most remarkable feature of this disease, was its continuance throughout winter. The prevalence of fevers in this County during the autumnal season, is exceedingly common. But no sooner does winter set in, than they cease.

Another feature, no less remarkable was the feeble effect of remediable agents, in arresting its progress, when fully formed.

Although the disease was obstinate and tedious, very few cases proved fa-

tal, unless from neglect or mismanagement, under such circumstances its mortality was great.

The disease was marked by three distinct stages, each of which, had its peculiar symptoms.

The first stage, commenced with nausea, and some degree of tormina, which was soon followed by languor, listlessness, and disinclination to motion, a palid face with contracted features, coldness of the surface, particularly of the extremities; a frequent, small, and incompressible pulse; a sense of fullness in the head, particularly about the frontal protuberances. These symptoms after continuing two or three hours, were followed by a chill, which was slight, and of short dura-

tion; leaving the patient in a comfortable situation, so much so, that he fancied himself well. Unless, however, appropriate remedies were used, a repetition of the chill, generally occured about the seventh day, which rendered all his hopes delusive. During the interval, the patient, remained in a state approaching so near the healthy, as to decieve an ordinary observer. The strength was little impaired, the apetite good, the secretions and excretions natural. But upon a minute investigation, the pulse was found more frequent, and smaller than natural; the skin rather cold; the venous circulation languid; and a slight uneasiness was felt over the region of the liver, an pressure, evidently indicating that congestion was already forming. This stage continued ten or twelve

days, before fever was fully developed.

2nd stage. It was in this stage, that the true character of the disease was manifested. There was much gastric distress, with frequent retchings accompanied with ejections of small quantities of thick bile, of a dark yellow colour, and frequently of a greenish cast; tenderness of the epigastrium on pressure; fullness in the region of the liver; a sense of internal heat, particularly of the stomach; a recession of blood from the surface; the pulse was small, frequent, and corded. At this time, some one of the abdominal viscera, most frequently the liver, was congested. The disease continuing longer, there were determinations

to the head, accompanied with delirium, and subsultus tendinum. The tongue throughout this stage was dry, encrusted in the centre, and florid at the tip and edges. At other times it was entirely clean, and of a deep scarlet colour, with the papillæ considerably elivated. The eyes somewhat glassy and insensible to light. The vessles of the conjunctiva were injected. There was also contraction of the levator and depressor muscles of the lips, so as to present a grinning appearance. Frequently while the extremities were unusually cold, there was at the same time, inordinate heat of the whole body. Blood drawn at this period, was of a dark colour, and so thick as to escape but slowly from a large

orifice. It speedily formed a firm coagulum, and readily separated into crassamentum and serum. The crassamentum contracted into a firm and small bulk. I have seen blood drawn in vessels six or eight inches in diameter, in which was soon formed a coagulum, not more than two or three inches in diameter, and of so firm a consistence, that it could easily be suspended on the end of a probe: its surface was covered with a buffy coat. The urine was scanty and high coloured. The alvine evacuations, were thin and watery, and of a whitish appearance. This stage usually continued eight or ten weeks.

3th stage. This stage was marked by great derangement of the brain;

delirium low and muttering; subsultus tendinum; great muscular weakness; deliquium animi when raised in the erect position; laborious respiration, attended with heaving of the shoulders, and impared sensibility. The remedies administered produced no apparent effect. The application of sinapisms and blisters was not followed by vesication. The discharges from the bowels were very fœtid and dark. The pulse was frequent, small, and compressible. This stage seldom continued more than four or five days.

Causes. From what has been said, respecting the seasons &c, it is evident that the disease, was owing to the action of heat and moisture on vegetable matter. To render it more

evident, I will mention some striking examples.

Heat, though essential, was not alone, sufficient to produce it. Our hottest seasons, when dry, are healthy. Lind states that the dry season in Senegal, the hottest part of the year in that country, is healthy. In tropical countries, the hot and dry seasons, are healthy; but soon after the rains commence, they become sickly. Lind speaking of Guinea, says, "this as most tropical countries, has, properly speaking, only two seasons, the wet and the dry. The first is commonly of about four months continuance, and is the season of sickness; whereas for many months in the dry season, most parts of this country are equally healthy and pleasant

with any in the world.)) No sooner, however, do the rains set in, than the ravages of disease commence, and continue throughout the wet season, and afterwards, until the superabundant moisture be evaporated. As soon as this is effected, the health of the country is restored, except in those places, which continue wet throughout the year. Moisture then was also necessary to its production.

Heat and moisture, though both essential, were not sufficient to produce it. Many instances are mentioned of vessels in port, immediately on the commencement of disease among their crew pushing out to sea with the effect of immediately arresting its progress. In the immense swamps

of the south before the forests are cut down, there is little or no sickness, even in the hottest weather; and instances have often occured of a fever being checked by the superabundance of moisture. Thus, a bilious fever was arrested in Brabant by inundating a neighbouring marsh; and Sir John Pringle tells us, that the inhabitants of Breda adopted the same expedient with success. Excessive rains have produced the same effect. Something more than heat and moisture, then was necessary: this additional circumstance is easily discovered, by bearing in mind the immediate appearance of the disease, after the storm; the condition of the drained millponds, and the heat of the weather, immediately succeeding.

On the other hand places formerly unhealthy on account of a neighbouring marsh, have been rendered healthy by draining it. Without entering into any lengthened detail, I will relate a circumstance, which fell under my own observation, and goes far to prove the correctness of the above proposition. Mr L—, a respectable farmer, residing in the western part of Amelia County, for several years had scarcely known disease in his family. His house was situated on an elivated spot, where the air had always been pure and refreshing. There was no stream of magnitude within less than four or five miles of his residence. There was, however, a large swamp extending

through his plantation, having a current in the middle, passing by the foot of the hill on which his house stood, at which place it was unusually wide, and formed one of those marshes, which are so common to the south. The water, however, was not stagnant. In the fall of 1822 he commenced draining it. But the greater part abounded with springs, which did not afford a sufficient quantity of water to form a stream, yet, moisture enough to cause the decomposition of vast quantities of vegetable matter, which had been accumulating for many years. On the approach of the succeeding spring and summer, the health, which his family had usually enjoyed, was supplanted by fevers

of the most malignant character. The attending physician, who was remarkable for his inteligence, immediately discovered their source, and apprised Mr G— of the necessity of either draining it entirely, or filling his former drains. After many fruitless attempts to render it dry, he, attength allowed the stream to resume its former rout; and the health of his family was completely restored.

It is proper to observe, that the continuance of the disease throughout the winter, is not an objection to its dependence on heat and moisture, co-operating on vegetable matter. On this point it is, only necessary to observe, that the internal change produced by mi-

asmata, often exist for a length of time, without exciting fever. Dr Chapman, speaking of the causes of Intermittent Fever, observes, "that the length of time, after an exposure to it, before its effects are manifested is uncertain. I have known it to lie dormant for several weeks and even months."

Diagnosis. The first stage was more liable to be confounded with Intermittent Fever, than any other disease. But by careful attention to the case, the distinction was sufficiently obvious. In Intermittents the apyrexia is generally complete, leaving no disturbance of circulation. Though occasionally irregular, yet, for the most part, they take on either the type

of the Quotidian, Tertian, or Quartan. In the Typhoid Fever, neither the hot, nor the sweating stage, was well marked. The pulse continued frequent, and small, until the approach of the succeeding chill. Neither the Tertian, nor any other form of Intermittents was imitated. The second chill came on about the seventh day, and was frequently followed by a third in a day or two. The furred tongue, which is so common an attendant of Intermittents, was absent. In the second and third stages, it was so clearly marked as not to be mistaken.

Prognosis. The termination of the disease was generally favourable, when the officiousness of quacks did not change its character. Having

reached the second stage, its progress could not be arrested. Irritability of stomach; heavy stupor; low muttering with delirium; singultus; vomiting dark matter; coldness of the tongue and breath; imperfect respiration, attended with heaving of the shoulders; humidity and inelasticity of skin; haggardness of countenance; inertness of remedial agents; and the supine and extended position, were unfavourable symptoms. On the other hand, abatement of the symptoms; equlibrium of temperature; return of warmth; subsidence of delirium; dejection of dark offensive matter; and ability to resum the curved position, were favourable.

Post Mortem. The mucous and

peritoneal coats of the stomach were inflamed, the latter chiefly about its curvatures. The omenta were phlogosed, particularly the omentum minus. The muscular coat was seldom diseased. The lungs often presented an unnatural appearance. On their anterior part, in some cases, considerable portions somewhat resembled the liver, both in appearance and weight. The liver and spleen were phlogosed; the membrane on the posterior surface of the liver, particularly about the lobulus spigelii; the cellular substance investing the hepatic duct, artery and vena portarum, were always more or less inflamed. Sometimes, also the brain was congested, and the arachnoid membrane phlogosed.

Pathology reveals to us three sets of vessles morbidly affected in fever, viz, the arteries, veins, and capillaries, of these the two first are mutually dependent, the last have somewhat an independent action; they are all, however, governed by the same laws, and influenced by the same causes; but in different degrees, according to their power of action, or the irritability with which they are endowed. We therefore find that although all are affected, they still suffer in differt degrees: as an instance, let us take the cold stage of Intermittent Fever, here we find the capillaries completely involved, the veins sluggish and the arteries less affected than all, the same condition

occurs in the disease of which I am treating. Believing miasmata to be the chief cause of this derangement, let us investigate its effects. If we view its first impression on the system, from the commencement of an attack of fever, to its most aggravated form, we will find that it exerts such a powerful influence, as to produce a paralysis (if I may so term it) of the bloodvessels; robbing them of their power of action, and suffering that state of congestion to ensue which exist in this disease. All the symptoms indicate this. What causes that languor and debility which ushers in the disease? What causes that sluggishness and inactivity in the capillaries, and the consequent coldness

of the skin? What causes that particular state of the stomach which post mortem examinations reveal? The answer to all these is plain "Ventriculo languido, omnia languent" The concentrated power of miasmata invading the system in its most sensible part by nervous influence paralyzes the bloodvessels. The vis medicatrix natura of Cullen, or some inexplicable cause, endeavours to arouse the system by exciting vascular action; but stunned as it were, by the violent attack, only one set of vessles (the arteries) recover their action, and these only partially. The veins and capillaries, therefore, became the receptacles of blood, and that state of congestion ensues, which I have noticed

and which, according to the laws of the animal economy, attacks those parts with the greatest force where the cause first acted. a loss of balance is therefore produced in vascular action, the system sinks under the impression, and the whole train of symptoms ensue.

Treatment. In the first stage, practitioners differed, as to the propriety of bloodletting, which arose chiefly from their confounding the oppressed, with the weak pulse. Experience, however, proved that bleeding, even in large quantities produced the most salutary effects. I have seen twenty or twenty five ounces, drawn at a single bleeding. Nor was a smaller quantity sufficient to make a decided impression on the system, unless carried

to that extent, it was altogether insufficient. A full bleeding was followed by a slower and fuller pulse; the capillary circulation immediately took on its healthy function; and the surface resumed its natural colour and warmth, evidently indicating the restoration of the lost balance of the circulation, which seemed to be the chief cause of the disease. After bleeding an emetic of Tartarised Antimony was given. If it was administered previous to the abstraction of blood, the patient experienced pain in some one of the abdominal viscera; most frequently of the liver. When this occured, the disease always proved obstinate. An emetic, however, given after bleeding, was found to be the most appropriate remedy. It was followed by the ejection of a large

quantity of bile, of a yellow, or greenish cast; the capillaries, were roused from their inactive state: and the surface was covered with a gentle perspiration, leaving the patient in a languid state, which generally terminated in sleep. In two or three hours after the administration of the emetic, twelve or fifteen grains of calomel was given, and to ensure its operation it was followed by a large spoon-ful of Castor Oil, which, usually in four or five hours produced copious evacuations of dark and offensive matter from the bowels. This-with a strict avoidance of exposure and improper diet, was all this stage required. All the cases taken in this stage and treated, as I have mentioned, readily gave way, and was fol-

lowed by a speedy recovery. But when from neglect or mismanagement, the disease was suffered to run into the second stage it was impossible to check its course. Nature left to herself, was far more efficient, than when interrupted by rash treatment. Contrary opinions, however, were entertained by some practitioners; and they accordingly set in upon the disease, in this stage, with a bold and precipitate hand, as though it was in the forming stage. They were, however, taught by sad experience (for twothirds of the unhappy patients subjected to such treatment died) that, after the disease had reached this stage, it was a mild and palliative treatment, alone, that was attended with success. It would be

easy to give, many interesting details on this point, which, however, would be a digression from the narrow compass of an essay like this. I will, therefore, detail the treatment that fell under my observation, as well as the result, in as concise a manner as possible. The principal remedies relied on, were, general and local bleeding, purgatives, diaphoretics, and vesicatories. Irritability of stomach, attended with a sensation of internal heat, tenderness of the epigastrium on pressure, a tongue foul in the centre and florid at the tip and edges, excluded the use of emetics. Bleeding required great caution. The indications for its use, were the corded pulse, difficulty of breathing, restlessness, and a dry skin. Under such

circumstances, it was followed by a removal of these symptoms, as well as a more equal distribution of blood. The quantity taken was regulated by the effect produced, that is, it was drawn until a decided impression was made on the system. In most cases ten or twelve ounces induced a state approaching to synchope. Nor was a single bleeding sufficient; repetition was required; which was regulated by the effect produced, and the appearance of the blood taken. When it did not induce exhaustion and when the blood speedily coagulated into a firm mass, having the surface covered with a buffy coat, repetition was required. After general bleeding had been carried to a sufficient extent, cups were

applied, immediately over the seat of congestion, followed by a large blister.

Purging was of great utility the mildest purgatives, were most beneficial, except in those cases, where the biliary secretion was interrupted or when, the contents of the alimentary canal, were so adhesive, as to resist the action of mild purging; under such circumstances, calomel was given in the dose of two or three grains, repeated every two hours, until twelve or fourteen grains were taken, and followed by a large spoonful of castor oil, which operated freely causing copious discharges of bilious and offensive matter, from the bowels. Calomel given in the dose of ten or twelve

grains, succeeded by an ounce of castor oil, was also extremly beneficial. When it was only required to keep the bowels in a soluble state the sulphate of soda in the dose of one or two drams, with the addition of one sixth of a grain of tartar emetic, repeated every two or three hours, was much used. Mild injections were also of great utility.

Diaphoretics, were administered, after the system was properly reduced. Nitras Potassa in the dose of eight or ten grains, with the addition of the tenth or twelth of a grain of Tart Emetic and combinations of Ipecacuanha and Opium, were principally used. The former was given, when it was required

to keep the bowels in a soluble state, and at the same time to produce a slight action of the skin. To render diaphoresis more certain, warm pediluvium, or the vapour bath, was used at the same time. When there was restlessness and anxiety, which arose from mere irritability, Pulv Ipecac Comp was generally given. While it allayed irritation, it produced a gentle diaphoresis. But at the same time, other symptoms demanded attention. When there were great determinations to the head, cups were applied to the temples, followed by cold applications; while at the same time the extremities were immersed in warm water. In severe cases, a blister was

applied to the head, and sinapism to the extremities.

For the relief of the irritable stomach, cups were applied to the epigastric region, followed by cold applications, and a large blister to the same part. Cold drinks, such as ice water or lemonade, in very small quantities at a time, were also given.

The diet consisted chiefly of rice, panado, or ricewater. Balm tea, or apple water was used as drinks.

The success of this treatment was great. Of those who were subjected to it, not more than one in fifty died.

As to the treatment in the third stage. I cannot speak from

experience. The indication was obviously to give strength to the system. The most appropriate remedies, were, Carbonate of Ammonia, wine whey; Infusion of bark alone, or conjoined with Serpentaria; sinapisms to the extremities, and a nourishing diet.

Finis